

## Occupational Safety Competency 1.5

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**Competency 1.5** Occupational safety personnel shall demonstrate a working level knowledge of the purpose, general content, development, and performance of worker occupational safety training.

### 1. Supporting Knowledge and Skills

- a. Identify safety training requirements addressed in applicable regulations or Department of Energy Orders.
- b. Discuss the basics of training development techniques, emphasizing the importance of using behavioral objectives.
- c. Discuss the considerations that must be addressed in the development of a training course. Describe the various types (and uses) of training material and techniques.
- d. Discuss the basics of evaluating a training course or program and the importance of, and methods for, evaluating the effectiveness of occupational safety training.
- e. Discuss the role and limitations of worker training in a comprehensive safety program.

### 2. Self-Study Activities (corresponding to the intent of the above competency)

Below are two web sites containing many of the references you may need.

Web Sites		
Organization	Site Location	Notes
Department of Energy	<a href="http://wastenot.inel.gov/cted/stdguido.html">http://wastenot.inel.gov/cted/stdguido.html</a>	DOE Standards, Guides, and Orders
U.S. House of Representatives	<a href="http://law.house.gov/cfr.htm">http://law.house.gov/cfr.htm</a>	Searchable Code of Federal Regulations

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### 3. Summary

An occupational safety professional may be called upon to evaluate both the industrial hygiene-related training and qualifications of line employees, e.g., as required by an expanded OSHA standard, as well as the professional qualifications of occupational safety professionals and technicians. For the former, the adequacy of required training is most certainly demonstrated through the review of the training lesson plan and the employee training records that verify attendance. Because most required training is performed in response to specific requirements found in applicable mandatory guidance, the contractor should have a lesson plan describing a training format that addresses these requirements. The adequacy of training could further be assessed by sitting in on a training session to verify course content and presentation, as well as instructor competence. Determining whether the required personnel actually received the training may be performed by locating the rosters of individuals trained. Questioning individual employees on technical points in order to measure their knowledge may create an atmosphere of hostility and not genuinely reflect the adequacy of training; observation of conduct in the field or otherwise on the job, or general questions determining subject familiarity may be more realistic measures.

Evaluating the competence of occupational safety professionals should be geared towards verification of their certification, of the completion of graduate-level training, or of high quality short courses. A review of the breadth and depth of work experience would also indicate employee qualification. Knowledge as indicated by fluency in the discussion of certain general technical issues might also demonstrate the technical competence and qualification. The DOE Technical Qualification Program (TQP), which this study guide supports, identifies a comprehensive set of industrial hygiene competencies, accompanied by knowledge and skills statements, found in the Occupational Safety Qualification Standard. The TQP can also be used as a tool to assess the qualifications of DOE occupational safety professionals.

The occupational safety professional should be familiar with the content and application of DOE O 360.1, *Training*. As an overview, the objectives of the Order are stated below:

- a. Assign responsibilities and provide requirements for establishing, implementing, documenting, and evaluating training programs for Federal employees.
- b. Commit to the continuing development of employees to ensure quality performance from a technically competent, versatile, and diverse workforce.
- c. Establish the requirements for the training and qualification of technical employees and managers whose position requires them to provide management direction or oversight that could impact the safe operation of a defense nuclear facility.

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The facility's training organization and programs should be evaluated periodically to determine whether they are achieving the established goals and objectives. The effectiveness of training programs to produce qualified personnel should also be evaluated periodically. This should be accomplished by reviewing operating occurrences, interviewing job incumbents and first-line supervisors, observing operations, etc. The results of these evaluations, if used correctly, will help ensure a facility of safe, efficient, and reliable operations.

The following considerations should be emphasized when evaluating training and qualification programs:

- The responsibility for monitoring indicators, analyzing data, and approving revisions is clearly defined.
- The training department is alerted to facility operating, maintenance, and industrial safety experiences.
- Communication on training effectiveness occurs between plant supervisors and the training department.
- Employee opinion of the equality and effectiveness of training is collected periodically.
- The training department is alerted to employee performance errors.
- The training department meets with maintenance and operations supervisors and engineers to determine potential training problems.
- Training uses facility inspection and evaluation reports to guide program revisions.
- Facility modifications and procedure changes are monitored for training consequences.
- Training monitors industry operating and maintenance experiences for program impacts.
- Regulatory changes are reviewed for training consequences.
- Program performance data are analyzed.
- Proposed changes are reviewed by appropriate facility and training personnel.
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### 4. Exercise Solutions

EXERCISE 1.5-A Identify safety training requirements addressed in applicable regulations or Department of Energy Orders.

ANSWER 1.5-A Refer to the following table for a sampling of the training requirements called out in the key worker safety rules and regulations. Other specific regulations are addressed in study guides for Occupational Safety competencies 2.1, 2.2, and 2.3. Additionally, you should check the OSHA home page (<http://www.osha.gov/>) for other worker safety information and training providers (e.g., Safety & Health Internet Sites at <http://www.osha.gov/safelinks.html>).

Key DOE & OSHA Worker Safety Regulations	Sample Worker Safety Training Requirements
DOE O 360.1, <i>Training</i>	1. OBJECTIVES. a. Assign responsibilities and provide requirements for establishing, implementing, documenting and evaluating training programs for Federal employees. b. Commit to the continuing development of employees to ensure quality performance from a technically competent, versatile, and diverse work force. c. Establish the requirements for the training and qualification of technical employees and managers whose position requires them to provide management direction or oversight that could impact the safe operation of a defense nuclear facility.
DOE O 440.1, <i>Worker Protection Management for DOE Federal and Contractor Employees</i>	DOE Elements shall: ... k. Provide workers, supervisors, managers, visitors, and worker protection professionals with worker protection training.
29 CFR 1910, <i>Occupational Safety and Health Standards for General Industry</i>	(4) Management and supervisor training. On-site management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive 40 hours initial training, and three days of supervised field experience (the training may be reduced to 24 hours and one day if the only area of their responsibility is employees covered by paragraphs (e)(3)(ii) and (e)(3)(iii)) and at least eight additional hours of specialized training at the time of job assignment on such topics as, but not limited to, the employer's safety and health program and the associated employee training program, personal protective equipment program, spill containment program, and health hazard monitoring procedure and techniques.

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Key DOE & OSHA Worker Safety Regulations	Sample Worker Safety Training Requirements
29 CFR 1926, <i>Safety and Health Regulations for Construction</i>	(9) Employee Information and Training. (i) The employer shall, at no cost to the employee, institute a training program for all employees who are likely to be exposed in excess of a PEL and for all employees who perform Class I through IV asbestos operations, and shall ensure their participation in the program. (ii) Training shall be provided prior to or at the time of initial assignment and at least annually thereafter. (iii) Training for Class I operations shall be the equivalent in curriculum, training method and length to the EPA Model Accreditation Plan (MAP) asbestos abatement workers training (40 CFR part 763, subpart E, appendix C).
29 CFR 1960, <i>Basic Program Elements for Federal Employee Occupational Safety and Health Programs and Related Matters</i>	SUBPART H - TRAINING 1960.54 Training of top management officials. 1960.55 Training of supervisors. 1960.56 Training of safety and health specialists. 1960.57 Training of safety and health inspectors. 1960.58 Training of collateral duty safety and health personnel and committee members. 1960.59 Training of employees and employee representatives. 1960.60 Training assistance.

**EXERCISE 1.5-B** In the context of the systematic approach to training (SAT), discuss the basics of training development techniques, emphasizing the importance of using behavioral objectives.

**ANSWER 1.5-B** (Any reasonable paraphrase of the following)

ELEMENTS OF THE SYSTEMATIC APPROACH TO TRAINING	
Element	Description
Analysis	Ensures training activities are oriented to job requirements by identifying the specific tasks involved in a given job. Training requirements are determined by analyzing the job and its component tasks. Organizational needs are also assessed to determine the resources required to support identified training requirements.
Design	Begins with developing terminal and enabling learning objectives (also referred to as behavioral objectives because the objective is designed to change the learner's behavior in a particular way) based on information gathered from the analysis phase. Skills and knowledge associated with performing a task well are translated into enabling objectives. The objectives are then organized into instructional units and sequenced to aid the learning process. The objectives become the guides for the development of learning strategies, course content, and training materials. Additional design activities include identifying the appropriate training setting, developing test items and examinations (also done in the next phase), and documenting key components of this phase.

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ELEMENTS OF THE SYSTEMATIC APPROACH TO TRAINING	
Element	Description
Development	The actual preparation of lesson plans, instructor guides, training aids, and training materials. Formulation of additional enabling objectives and revisions of test items and objectives may also occur. Both technical and instructional reviews of the products are conducted, and changes are made as necessary to ensure the content is both technically and educationally correct and relevant.
Implementation	Consists of resource allocation, planning, and scheduling, as well as the actual conduct of training. Resource allocation includes assigning instructors and support staff and scheduling training in facilities.
Evaluation	The critical feedback loop to ensure that the training meets its objectives. Feedback from instructors, trainees, evaluators, and supervisors is reviewed for its potential refinement of future training. Evaluation is a continuing action that occurs throughout the entire process and beyond. Evaluation results are translated into change actions or recommendations based on different criteria such as adequacy of content, tests, presentation, or documentation, and posttraining job performance.

From the time that learning (or behavioral) objectives are prepared, virtually all the training processes and products are based on or specifically relate to these learning objectives. Because the learning objectives are derived from job performance requirements, the resulting training programs are considered job-based.

**EXERCISE 1.5-C** Discuss the considerations that must be addressed in the development of a training course. Describe the various types (and uses) of training material and techniques.

**ANSWER 1.5-C** (From *The Occasional Trainer's Handbook*). In addition to instructor materials (e.g., instructor guides, overhead transparencies, slides, etc.), it is important to develop useful trainee materials that supplement the training and support the learning objectives. The trainee materials should provide organizers (e.g., agendas, objectives), reinforcements for concepts, communication of expected activities, references for additional information. Handouts and job aids are the most common trainee materials used in training. Handouts can be used to provide a summary of the presentation, replace or facilitate note-taking, serve as a discussion guide, reference background material, and sample forms, drawings, etc. Job aids are any device, chart, or other reference that reduce the amount of information the worker must recall or retain in order to successfully carry out a task. Job aids are often used in place of a training course or are provided during training to serve as a performance aid on the job.

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After deciding what must be taught, the best way to teach it must be determined. This is the instructional method. There is no one best instructional method. The choice of methods is often based on several selection criteria. In addition to the scope and content of the learning objectives, the following should be considered.

- Background and ability of the trainees.
- Stage of learning (e.g., new, refresher, or remedial).
- Level of learning required by the objective (i.e., simple to complex way we learn).
- Special needs of the trainees.
- Time allotted to delivery and application of the lesson.
- Time allotted to developing the lesson using that particular method, and available facilities.

Instructional methods are the strategies that are used during the course of instruction to convey information and to practice job skills. Some of the more common methods are:

- Lecture
- Discussion
- Case Studies
- Demonstration
- Laboratory or workshop exercises

There are many other methods and techniques that can be used. Whatever method is selected, there are two very important factors to be considered -- the nature of the objective and the target audience.

**EXERCISE 1.5-D** Discuss the basics of evaluating a training course or program and the importance of, and methods for, evaluating the effectiveness of occupational safety training.

**ANSWER 1.5-D** Tasks and associated skills and knowledge are translated into performance and learning objectives. The learning objectives in turn are used to create the course outline, which becomes the road map for the course developers in preparing lesson plans, test items and examinations, student materials, and training aids and equipment. This material is used by the trainers to conduct or present the training. All of this information is used to assess the

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effectiveness of the training program, which should be job- or performance-based as a result of the application of the systematic approach to training. The evaluation results, which become source data for the needs analysis process, are used to modify the training program.

The facility's training organization and programs should be evaluated periodically to determine whether they are achieving the established goals and objectives. The effectiveness of training programs to produce qualified personnel should also be evaluated periodically. This should be accomplished by reviewing operating occurrences, interviewing job incumbents and first-line supervisors, observing operations, etc. The results of these evaluations, if used correctly, will help ensure a facility of safe, efficient, and reliable operations.

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EXERCISE 1.5-E Discuss the role and limitations of worker training in a comprehensive safety program.

ANSWER 1.5-E A site safety plan, which is one aspect of a comprehensive safety program, establishes the policies and procedures to protect the safety and health of workers and the public from the potential hazards and mishaps. Worker training is a key ingredient to the successful implementation of a site safety plan or safety program.

The safety training program makes the workers aware of the potential hazards they may encounter, provides the skills and knowledge necessary to perform the work with minimal risk to worker health and safety, makes the workers aware of the purpose and limitations of safety equipment, and assures that workers can safely avoid or escape from emergencies. The level of training should be consistent with the worker's job function and responsibilities. The training program should involve both classroom instruction and hands-on practice, which can be as simple as a laboratory or shop exercise to an area drill, conducted in the field or simulated in a classroom. The training typically consists of safe work policies, procedures and practices; the nature of the anticipated hazards; handling emergent conditions and situations; safe use of safety equipment; handling, storage, and transportation of hazardous materials; worker rights and responsibilities; use, care, and limitations of personal protective clothing and equipment; changes and modifications; lessons learned; and legal and regulatory issues. (Adapted from the *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, prepared by NIOSH, OSHA, USCG, and EPA)

Factors that can limit the conduct and application of worker training (therefore affecting the success and effectiveness of the training) include:

- Availability of subject matter experts during the development and conduct of the training.
- Amount of time provided to develop and conduct the training.
- Amount of time available or permitted to practice the learned skills and knowledge.
- Difficulty of material.
- Length of training time.
- Amount of material covered.
- Clarity of material.
- Terminology used in material.

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- Pace of the training.
- Structure and sequence of material.
- Quantity and quality of exercises.
- Relevance of training to job performance.

EXERCISE 1.5-F Develop a simple matrix listing some of the advantages and limitations for the following training settings: self-paced instruction, on-the-job training, laboratory/workshop training, and classroom instruction.

ANSWER 1.5-F

Training Settings Matrix		
Setting	Advantages	Limitations
Self-paced/ self-directed instruction	<ul style="list-style-type: none"><li>• Close supervision is not required.</li><li>• It is useful as an adjunct to other methods of learning.</li><li>• The trainee controls the pace and flow.</li><li>• The trainee can pursue an interest not shared by other trainees.</li><li>• The trainee controls the number of examples and level of difficulty.</li></ul>	<ul style="list-style-type: none"><li>• The trainee must be self-motivated.</li><li>• The goal of the learning session must be clearly stated or understood by the trainee.</li><li>• Effectiveness may be based on the trainee's ability to make strategic decisions regarding instructional support.</li></ul>
On-the-job training (OJT)	<ul style="list-style-type: none"><li>• It is useful for developing job-specific training.</li><li>• It acts as a continuation of instruction received in formal courses.</li><li>• It reinforces classroom training when the job is complex.</li></ul>	<ul style="list-style-type: none"><li>• The job setting may not be conducive to learning (interruptions, noisy, too dangerous for trial-and-error mistakes).</li><li>• Support materials such as job aids are often a necessary adjunct.</li><li>• Qualified subject matter experts must be available to conduct the OJT.</li></ul>

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Training Settings Matrix		
Setting	Advantages	Limitations
Laboratory/ workshop	<ul style="list-style-type: none"><li>• It is useful if multiple job conditions (environment, system, equipment, etc.) are required for task performance.</li><li>• It permits application of course material and basic skills in a hands-on environment.</li><li>• It is effective when used to train basic skills that support task performance.</li><li>• It is useful when tasks, elements, and skills require hands-on practice to achieve mastery.</li><li>• It is useful when OJT is impractical.</li></ul>	<ul style="list-style-type: none"><li>• It usually requires fewer trainees per trainer.</li><li>• It may require special facilities or equipment.</li><li>• It is time-consuming because trainees must be given the opportunity to practice until they reach an acceptable proficiency.</li></ul>
Classroom	<ul style="list-style-type: none"><li>• It works well for initial presentation of fundamental and basic theoretical knowledge.</li><li>• It is suitable when large quantities of basic knowledge must be presented.</li><li>• It works well when other training settings are not suitable or available.</li><li>• It is useful if there are no critical resource constraints--everything required for training can be presented in a classroom setting.</li><li>• It is useful if the subject matter changes frequently.</li></ul>	<ul style="list-style-type: none"><li>• Classroom training cannot replicate OJT experience.</li><li>• Trainee involvement is limited.</li><li>• It is difficult to check learning before testing.</li><li>• It should not be used as a sole method when teaching job tasks.</li><li>• Trainee attention may wander.</li></ul>